

Simon Fraser University

MATH 154-1, Spring 2005

Midterm 2

March 9, 2005, 8:30 – 9:20 am

Last Name (please print): _____

First Name (please print): _____

Student Number: _____

Signature: _____

Instructions:

1. DO NOT OPEN THIS BOOKLET UNTIL TOLD TO DO SO.
2. Fill in the above box.
3. This exam contains 5 pages with a total of 6 questions. Once the exam begins please check to make sure your exam booklet is complete.
4. Only complete well-organized solution will receive full credit
5. If you run out of space in a problem, use the space on the back of the previous page and clearly indicate where the solution continues.
6. Only scientific calculators are allowed.
7. No book, paper, or device, other than the usual writing instruments, this booklet and a scientific calculator, shall be within reach of a student during the examination.
8. During the examination, speaking to, communicating with, or deliberately exposing written papers to the view of other examinees is forbidden.

Question	Marks
1	/4
2	/4
3	/4
4	/12
5	/12
6	/4
Total	/40

1 Answer **T** (true) or **F** (false) in the boxes provided. No explanation is necessary.
Every correct answer will receive **1**. **[4 marks]**

a) ☐ If f is continuous at $x = 0$, then f is differentiable at $x = 0$.

b) ☐ If the equation of the tangent line to the curve $y = f(x)$ at $(0,1)$ is $y = -x + 2$, then $f'(0) = -1$.

c) ☐ $(2^x)'_x = x2^{x-1}$.

d) ☐ $(x^{99} + 1)^{(100)} = 0$.

2 Use the formal definition to find the derivative of $y = \sqrt{2x+1}$ at $x = 0$.

[4 marks]

3 Find the equation of the tangent line to the curve $y = x^2 + 2$ that is perpendicular to the line $y = (1/2)x - 1$. **[4 marks]**

4 Find y' **[Each 4 marks]**

a) $\sec \frac{\pi}{5} + \frac{x^2 - x + 1}{\sqrt[3]{x}}$

b) $\tan^3(e^x + \sqrt{1+x^2})$

c) $y = (\sin x)^{\sin x}$

a) Suppose that $f'(x) = 3x + 1$. Find $\frac{d}{dx} f(x^2)$ at $x = 1$.

b) Given $x^3 + y^3 = 2xy$, find $\frac{dy}{dx}$ by implicit differentiation.

c) Let $f(x) = e^{-x^2} + x$. Find $\frac{d}{dx} f^{-1}(1)$. [Note that $f(0) = 1$].

6 When the radius r of a circle is 2 cm, the radius is increasing at a rate of 5 cm/s. How fast is the area of the circle changing at this time? **[4 marks]**